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REMARKS

In the Office Action, the examiner rejected Claim 5 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The examiner stated that it is not clear whether Claim 5 is related to a method of producing soybean powder or a method of using the soybean powder in making soybean milk. The examiner further stated that if the invention of Claim 5 is related to the method of using the soybean powder, Claim 5 may be subjected to a further restriction requirement. In Claim 5, the applicant intends to define the invention related to the method of using the soybean powder in making the soybean milk. Accordingly, the applicant has deleted Claim 5 from the instant case.

The examiner rejected Claims 2, 4 and 5 under 35 U.S.C. 103(a) as being unpatentable over Hawley et al. (U.S. Patent No. 3,642,490) in view of JP 9-191848 and JP 11-332496 and further in view of Boatright (U.S. Patent No. 6,426,112). The applicant has amended the set of claims of the instant application to more clearly define the features of the present invention. Although Claim 1 is a non-elected species and thus withdrawn from consideration, it is also amended in this opportunity because the inventions of Claims 1 and 2 include the same basic steps while the orders of the steps are different from one another. As noted above, the applicant has canceled Claim 5 because of the

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anticipated restriction requirement. Further, the applicant has canceled Claim 4.

The inventors investigated suitable conditions of heat treatment for removing disagreeable odor and taste remaining in the lipoxygenase-free soybeans simultaneously with drying (heat treatment) without use of pressure-resistant equipment in spite of use of sufficiently high-temperature water vapor, while still inhibiting lipid oxidation and side reaction of the protein. In the course of this investigation, the inventors found that penetration of water vapor into soybeans is prevented under atmospheric pressure, and that such water vapor treatment produces effects different from the effects by high-temperature air treatment while promoting drying.

As recited in Claim 2 amended, the essential features of the present invention reside in that (1) the method pulverizes lipoxygenase-free soybean grains into fine particles, (2) the method conducts a heat treatment on the fine particles with water vapor having a temperature in a range of 160 to 230°C for a time range of 30 to 300 seconds, and (3) the fine particles are placed under the atmospheric pressure throughout the heat treatment. The cited references do not show these essential features of the present invention as discussed in detail below.

The cited Hawley et al. reference is directed to a method of preparing a bland flavored, vegetable protein food and a bland flavored soy protein food of high dispersibility, and food products

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made therefrom. Unlike the present invention in which the fine particles are heat-treated, the method of Hawley et al. involves the process of forming a slurry of the crushed soybean in water. Then, the slurry containing a large volume of water is heat-treated by steam. For example, the abstract of the disclosure of the cited Hawley et al. reference reads as follows:

The preparation of a bland flavored, vegetable protein food product, preferably a soy protein food product, having excellent and controlled water dispersibility, by forming a slurry of the protein in water, preferably after separating the carbohydrates, sugars, and other nonproteins from the material, heating the slurried material practically instantaneously to elevated temperatures and severely physically working it, preferably by ejecting the slurry material from a nozzle while injecting steam into it, retaining the slurried material at elevated temperatures and under an elevated positive pressure for a brief, controlled time interval, and then suddenly releasing the pressure, volatilizing some moisture along with entrained, objectionable flavor and odor substances, and thereby causing partial cooling, removing the volatilized products and leaving a slurry of sterilized, bland flavored, highly water dispersible protein material, and then preferably drying the slurry to a bland tasting powder which is highly redispersible.

Rather than directly applying the heat treatment to the fine particles of soybean, the method of the Hawley et al. forms the slurry of the crushed soybean with a large percentage (83-95%) of water and applies the heat treatment to the slurry material. Since the slurry is used, the method of Hawley et al. also need a process of adjusting pH by adding chemicals. The present invention does not require to add such chemicals. Further, the heat treatment in the method of Hawley et al. is within the temperature range 140-160°C (285-320°F) which is apparently outside of the temperature

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range of the heat treatment of the present invention which is 160 to 230°C. In Hawley et al. if higher temperature than 160°C (320°F) are used, the ultimate product will tend to develop a gelling nature (column 6, lines 16-18). Therefore, the essential feature (2) of the present invention noted above is not shown or suggested by the cited Hawley et al. reference.

With respect to the feature (3) of the present invention, the fine particles are under the atmospheric pressure throughout the heat drying treatment. As noted above, the inventors discovered that the penetration of water vapor into soybeans is prevented under atmospheric pressure. Thus, it is essential to perform the heat treatment under the atmospheric pressure. On the contrary, the method of Hawley et al. requires the elevated pressure such as 85-100 p.s.i.g. during the heat treatment, which also requires pressure-resistant equipment. At the end of the heat treatment, the pressure is suddenly released. Because of the high pressure, the penetration of water vapor into soybeans is caused, which results in difficulty in dispersing the final product (powder) in liquid such as water. Such a high pressure and sudden release of the high pressure are unnecessary in the heat treatment of the present invention. Therefore, the essential feature (3) of the present invention is not shown or suggested by the cited Hawley et al. reference.

The cited JP 9-191848 reference and JP 11-332496 reference show the idea of using the powderized soybean that is lipoxxygenase

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free. The cited Boatrigh reference suggests that the lipoygenase-free soybean still contain "beany" order. However, none of these three references show the essential feature (2) of the present invention noted above where the heat treatment by steam is performed on the fine particles of soybean. Further, none of these three references show the essential feature (3) of the present invention noted above where the heat treatment by steam is performed on the fine particles of soybean under the atmospheric pressure.

As discussed above, since the essential features (2) and (3) of the present invention are not shown or suggested by any of the cited references, the present invention defined in Claim 2 is not obvious over the cited references taken singly or in combination.

The examiner rejected Claims 6 and 7 under 35 U.S.C. 103(a) as being unpatentable over Visser et al. (U.S. Patent No. 3,607,743) taken together with either of JP 8-196228 or JP 9-191848. The applicant has amended Claim 6 to include the limitation similar to that included in Claim 2 as amended. Namely, the essential features of the present invention defined in Claim 2 resides in the fact that (1) the soybean powder material is prepared by applying superheated water vapor over fine particles of soybean, (2) the superheated water vapor is applied over the fine particles under an atmospheric pressure in a temperature range of 160-230°, and (3) the granules are produced by placing the soybean powder material in

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a space defined by two opposing plates. The cited references do not show these essential features of the present invention.

The cited Visser et al. reference discloses a process for continuous agglomeration of solid particles from a suspension thereof in water by passing the suspension and a binding agent through an agglomeration zone in which a turbulent motion is maintained and adding binding agent to the agglomeration zone at varying rates responsive to the particle concentration of the aqueous stream flowing from the agglomeration zone. In the process of forming the granulated particles in the cited Visser et al. reference, the turbulent motion is used in the cylinder 2 and the agitator 3. In contrast, the granulation process in the present invention is performed by placing the soybean powder material in a space defined by two opposing plates. Thus, the essential feature (3) of the present invention defined in Claim 6 is not shown or suggested by the cited Visser et al. reference.

Further, the cited Visser et al. reference is silent about the idea of preparing the soybean powder material by applying superheated water vapor over fine particles of soybean. Thus, the essential feature (1) of the present invention is not shown or suggested by the cited Visser et al. reference. Further, the cited Visser et al. reference is silent about the idea of applying the superheated water vapor over the fine particles under an atmospheric pressure in a temperature range of 160-230°. Thus, the

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essential feature (2) of the present invention is not shown or suggested by the cited Visser et al. reference.

The cited JP 8-196228 reference or JP 9-191848 reference shows the use of granulated soybean powder. However, none of the cited JP 8-196228 and JP 9-191848 references show as to how the granulation process is performed. Further, none of the cited JP 8-196228 and JP 9-191848 references show as to how the soybean powder material is prepared before the granulation process. Thus, the cited JP 8-196228 reference or JP 9-191848 reference shows none of the essential features (1)-(3) of the present invention.

As discussed above, since none of the essential features (1)-(3) of the present invention are shown or suggested by any of the cited references, the present invention defined in Claim 6 is not obvious over the cited references taken singly or in combination. Claim 7 includes all of the limitation of Claim 6 and defines the present invention with further specificities. Thus, the present invention defined in Claim 7 is not obvious over the cited references taken singly or in combination.

The examiner rejected Claim 3 under 35 U.S.C. 103(a) as being unpatentable over Hawley et al. (U.S. Patent No. 3,642,490) in view of JP 9-191848 and JP 11-332496 and further in view of Boatright (U.S. Patent No. 6,426,112) and further in view of Visser et al. (U.S. Patent No. 3,607,743) taken together with either of JP 8-196228 or JP 9-191848. The applicant has amended Claim 3 to include the features of Claim 2. Thus, the essential features of

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the present invention are basically the same as that of Claim 6 as described above. Thus, the discussions regarding Claim 2 and Claim 7 equally apply to the invention of Claim 3. In short, none of the cited references show the essential features (1)-(3) of the present invention defined in Claim 3 (Claim 6), thus, the present invention defined in Claim 3 is not obvious over the cited references taken singly or in combination.


In this opportunity, the applicant has amended the specification to correct the minor wording errors therein. This is to verify that no new matter has been introduced by this amendment.

Under the circumstances, the applicant believes that the present application is in the condition for allowance, and the applicant respectfully requests that the present application be allowed and passed to issue.

Respectfully submitted,

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Dated: 6/22/06

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